

**DRAFT FINAL
EXPANDED ENGINEERING EVALUATION/COST ANALYSIS (EEE/CA)
FOR THE
McLAREN TAILINGS SITE
COOKE CITY, MONTANA**

Engineering Services Agreement DEQ/MWCB 401027
Task Order Number 05

Prepared for:

Mr. John Koerth
Montana Department of Environmental Quality
Mine Waste Cleanup Bureau
P. O. Box 200901
Helena, Montana 59620

Prepared by:

Pioneer Technical Services, Inc.
P.O. Box 3445
Butte, Montana 59702

May 2002

APPENDIX A

**ANALYTICAL DATA FOR THE McLAREN TAILINGS SITE
COMPLIED BY PIONEER TECHNICAL SERVICES, INC.
(1993, 2000, AND 2001)**

Table A-1: McLaren Tailings Site Source Sampling Summary
September 2001

SOURCE	TEST PIT I.D.	DEPTH INTERVAL (feet)	DESCRIPTION	TAL	ABA	TCLP	AGRONOMIC	PHYSICAL
BACKGROUND SOIL	BG1-1A	0.0 - 0.5	B-Horizon Soil, silty loam, dark brown ~ 1,000' east and north of Waste Rock Dump #1.					
	BG1-2A	0.0 - 0.5	B-Horizon Soil, silty loam, dark brown ~ 800' east and slightly south of Waste Rock Dump #1.					
	COMPOSITE SAMPLES	BG1-1	Surface composite (0 - 6") BG1-1A.	Table A-5				
		BG1-2	Surface composite (0 - 6") BG1-2A.	Table A-5				
		BG1-3	Surface composite (0 - 14") Borrow Area 1-4A (BA1-4A). Potential borrow area sample acceptable for background sample also.	Table A-5				
WASTE ROCK DUMP #1	WR1-1	0.0 - 0.5 0.5 - 3.6	Silty gravel, yellow, light brown. Silty sand, dark brown, with red streaks.					
	WR1-2	0.0 - 1.0 1.0 - 2.8 2.8 - 3.5 3.5 - 4.7	Sandy gravel, yellow/orange. Topsoil, silty loam B-Horizon silty sand, light brown Silt with cobble stone; at 4.7 feet encountered cobble stones and red bedrock.					
	WR1-3	0.0 - 0.2 0.2 - 0.8 0.8 - 1.2 1.2 - 3.2 3.2 - 8.0	Surface waste yellow, orange gravel with some silt and sand Topsoil B-Horizon (12" -) cobble stones with sand Sand and gravel (2" -) rock with rounded corners. No samples were collected.					
	WR1-4	0.0 - 0.5 0.5 - 4.0	Sandy gravel, light brown, yellow. Silty gravel, light brown, with some large rocks (12" +) encountered wooden debris.					
	WR1-5	0.0 - 0.1 0.1 - 3.2 3.2 - 8.0	Sand-gravel, yellow Silty, sand loam, dark brown; Sand gravel, streambed type, occasional large rock (12" +) rounded corners.					
	WR1-6	0.0 - 3.3	Yellow, light brown silty sand, gravel with approximately 15% (6" -) rock. Some gray sand in small pockets. No samples were collected.					
	WR1-6A	0.0 - 6.0	Yellow/orange material with silts and some clays, galena and pyrite rocks (6" -). No samples were collected. (Realized a number six sample already collected).					
	WR1-7	0.0 - 5.0	Silty-clay, sulfide looking material, large rock (12" -).					
	WR1-8	0.0 - 1.7 1.7 - 3.5	Mine wastes, gray and yellow silts and fine grained sand. Topsoil, silty loam. No samples were collected.					
	WR1-9	0.0 - 0.3 0.3 - 2.1 2.1 - 3.0	Mine wastes. Mixed topsoil with mine wastes. Yellow/orange mine wastes with gray, silty sands with approximately 40% small rock (3" -). No samples were collected.					
	WR1-10	0.0 - 1.2 1.2 - 3.3	Yellow/orange mine wastes with silty sands. Silty loam topsoil. No samples were collected.					
	WR1-11	0.0 - 0.3 0.3 - 2.0	Mine wastes. Topsoil. No samples were collected.					
	WR1-12	0.0 - 1.3 1.3 - 2.5 2.5 - 3.6	Mine wastes. Mixed topsoil and mine wastes. Mine wastes with large rocks (12" -). No samples were collected.					

Table A-1: McLaren Tailings Site Source Sampling Summary
September 2001

SOURCE	TEST PIT I.D.	DEPTH INTERVAL (feet)	DESCRIPTION	TAL	ABA	TCLP	AGRONOMIC	PHYSICAL	
	WR1-13	0.0 - 2.5	0 - 30" orange/yellow mine wastes with silty clays. No samples were collected.						
	WR1-14	0.0 - 0.5	Silty sand that appears mineralized in places.						
		0.5 - 3.5	Silty loam topsoil.						
		3.5 - 4.3	Fine grained silty sand, occasional large boulders (12" +). No samples were collected.						
	WR1-15	0.0 - 0.6	Silty sand, gravel, tan and orange in color.						
		0.6 - 1.6	Dark brown, silty loam top soil.						
		1.6 - 3.0	Some boulder, silty sand, dark brown. No samples were collected.						
	WR1-16	0.0 - 3.2	Yellow gray, silty sand.						
		3.2 - 8.0	Light brown, reddish silty sand, approximately 25% rock (6" -). No samples were collected.						
	WR1-17	0.0 - 1.3	Yellow, light brown, silty gravel.						
1.3 - 3.3		Light brown, silty with large rocks (12" +). Mine waste appears to continue below this. No samples were collected.							
WR1-18	0.0 - 0.7	Yellow, light brown waste.							
	0.7 - 1.5	Dark brown, silty loam, topsoil. No samples were collected.							
WR1-19	0.0 - 3.0	Silty gravel, yellow and light brown.							
	3.0 - 5.0	Dark brown, silty sand with large rocks approximately 60% (8" +). Mine waste appears to continue at depth. No samples were collected.							
WR1-20	0.0 - 5.0	0 - 60" yellow, light brown, silty sand with occassional large rock. No samples were collected.							
	COMPOSITE SAMPLES	WR1-1 WR1-2 WR1-3	Surface composite (0 - 6") WR1-1A and WR1-2A. Subsurface composite WR1-1B, WR1-2B, WR1-4A, WR1-4B, and WR1-5. Surface and subsurface composite WR1-7.	Table A-5 Table A-5 Table A-5	Table A-6 Table A-6 Table A-6	Table A-3 Table A-3 Table A-3	Table A-2 Table A-2 Table A-2	Table A-4 Table A-4 Table A-4	
TAILINGS POND SURFACE	TP1-1 A	0.0 - 0.5	Moderately vegetated.						
	TP1-2 A	0.0 - 0.5	Moderately vegetated.						
	TP1-3 A	0.0 - 0.5	Moderately vegetated.						
	TP1-4 A	0.0 - 0.5	No vegetation, exposed tails.						
	TP1-5 A	0.0 - 0.5	No vegetation, exposed tails. Unable to go deeper than 2 to 3". Encountered hard pan material.						
	TP1-6 A	0.0 - 0.5	No vegetation, exposed tails.						
	COMPOSITE SAMPLES	TP1-1 TP1-2	Surface composite (0 - 6") TP1-1, TP1-2, and TP1-3. Surface composite (0 - 6") TP1-4, TP1-5, and TP1-6.						Table A-5 Table A-5
TAILINGS POND BOREHOLES	BH-1	0.0 - 3.0	Cover soil, gravelly sand, some silt, frequent cobbles, damp, brown.						
		3.0 - 14.8	Sandy silt, some clay, tailings with pyrite flakes; damp to moist brown, loose to very loose.						
14.8 - 16.0		Sandy gravel, some silt, moist, pale orange, very dense. Samples collected at 5', 10', and 15' (see bore logs in Appendix B).							
	BH-2	0.0 - 2.0	Cover soil, gravelly sand, some silt, damp brown.						
		2.0-7.5	Silty sand, tailings with pyrite flakes, damp to moist, olive brown, loose.						
		7.5 - 14.5	Sandy clay, tailings with pyrite flakes, moist, grey, soft, high dry strength.						
		14.5 - 16.5	Sandy gravel, subrounded, damp to dry, reddish brown to pink, very dense. Samples collected at 5', 10', and 15' (see bore logs in Appendix B).						
	BH-3	0.0 - 2.5	Cover soil, gravelly sand, some silt, frequent cobbles.						
		2.5 - 7.0	Silty sand, tailings with pyrite flakes, varved damp to wet, reddish brown to grey, very loose.						
		7.0 - 15.8	Clayey silt, some fine sand, tailings with pyrite flakes, moist, grey to yellowish brown, very soft, high dry strength.						
		15.8 - 12.5	Sandy gravel, rounded to subangular, wet, dark brown to orange, dense. Clasts are hard and granite. Samples collected at 5', 10', 15', and 20' (see bore logs in Appendix B).						
		BH-4	0.0 - 2.5						Cover soil, gravelly sand, some silt, cobble, damp, brown.
			2.5 - 14.3						Sandy silt, some fine gravel, tailings with pyrite, damp, brown to grey medium dense to loose.

Table A-1: McLaren Tailings Site Source Sampling Summary
September 2001

SOURCE	TEST PIT I.D.	DEPTH INTERVAL (feet)	DESCRIPTION	TAL	ABA	TCLP	AGRONOMIC	PHYSICAL
	BH-5	14.3 - 16.4	Sandy gravel, some silt, angular to subrounded, damp with moist area at 15.3' orange brown to light grey, very dense. Gravel clasts tended to be granitic. Samples collected at 5', 10', and 15' (see bore logs in Appendix B).					
		0.0 - 1.5	Cover soil, gravelly sand, some silt, damp, brown.					
		1.5 - 9.0	Sandy silt, tailings with pyrite, varved moist, grey, loose.					
	BH-6	9.0 - 16.5	Gravelly sand, some clay, moist to wet, brown, medium dense. Clay had high dry strength. Samples collected at 5', 10', and 15' (see bore logs in Appendix B). Encountered water at 16.5'.					
		0.0 - 2.5	Cover soil, gravelly sand, some silt, damp, brown.					
		2.5 - 14.0	Silty sand, tailings with pyrite flakes, damp to moist, grey, loose.					
	BH-7	14.0 - 21.5	Gravelly sand, grading to sandy gravel, moist to wet, angula to subrounded, orange to reddish brown, medium dense to dense. Sampes collected at 5', 10', 15', and 20' (see bore logs in Appendix B).					
		0.0 - 2.5	Cover soil, gravelly sand, some silt, frequent cobbles, damp brown.					
		2.5 - 11.0	Sandy silt, tailings with pyrite flakes, varved damp to moist, brown to grey, very loose, low dry strength.					
	BH-8	11.0 - 21.4	Clayey silt, tialings with pyrite flakes, wet, dark grey to dark olive grey, very loose, moderate dry strength.					
		21.4 - 25.3	Sandy gravel, angular, wet, very dense. Samples collected at 5', 10', 15', 20' and 25' (see bore logs in Appendix B). Encountered water at 12'.					
	BH-9	0.0 - 2.5	Cover soil, gravelly snad, some silt, occasional cobbles, damp, brown.					
		2.5 - 15.7	Sandy silt, tailings with pyrite flakes, damp to moist, brown to grey, very loose, low dry strength.					
		15.7 - 25.5	Sandy silt, tailings with pyrite flakes, moist to wet, grey, very loose, low dry strength.					
OLD STREAM CHANNEL/ EROSION GULLY	OSC-1A OSC-2A OCS-3A	0.0 - 0.5	Silty sand with gravel, reddish color.	Table A-5 Table A-5	Table A-6 Table A-6			
		0.0 - 0.5	Silty sand, yellow, tan in color.					
		0.0 - 0.5	Small area downstream of sample locations. No sample was collected.					
	COMPOSITE SAMPLES	OSC-1 OSC-2	Surface composite of OSC-1A. Surface composite of OSC-2A.					
BORROW AREA	BA1-1	0.0 - 0.3	Silty-fine grained sand, light brown.					
		0.3 - 7.5	Silty-fine grained sand dark brown.					
	BA1-2	0.0 - 5.0	Silty sand loam, light brown. Moderate root growth on surface.					
		5.0 - 7.0	Silty sand, gravel, light brown, ~20% rock (2" -)					
	BA1-3	0.0 - 1.0	Light brown silt.					
		1.0 - 9.0	Fine grained sand. No rock. White to light brown. No samples collected.					
	BA1-4	0.0 - 1.17	Silty loam, topsoil, dark brown.					
		1.17 - 4.3	Silty sand with gravel, ~25% rock (2" -) occasional larger rock (12" +).					
		4.3 - 7.0	Fine grained sand.					
	BA1-5	0.0 - 0.7	Topsoil of black, silty sandy loam.					
		0.7 - 4.2	Fine grained sand with gravel and small cobbles; light brown to tan with several large rocks. No samples were collected.					
	BA1-6	0.0 - 3.3	0 - 40" backhoe refusal due to large rocks of 24" plus fine grained sand, light brown, mixed with angular rock (3" -). No samples were collected.					

Table A-1: McLaren Tailings Site Source Sampling Summary
September 2001

SOURCE	TEST PIT I.D.	DEPTH INTERVAL (feet)	DESCRIPTION	TAL	ABA	TCLP	AGRONOMIC	PHYSICAL
	BA1-7	0.0 - 3.3	0 - 40" backhoe refusal due to large rock or bedrock plus silty, fine grained sand with 30% rock (6" -). No samples were collected.					
	BA1-8	0.0 - 1.0	Silty, fine grained sand, light brown.					
		1.0 - 4.0	Silty fine grained sand with large rock (18" -) with very little small rock or gravel.					
		4.0 - 8.0	Fine grained sand with silt, light brown in color. No samples were collected.					
	BA1-9	0.0 - 3.0	Silty fine grained sand, light brown, ~30% rock, (3" -).					
		3.0 - 5.0	Large boulders, (24" -).					
		5.0 - 6.0	Fine grained sand with some silts.					
	BA1-10	0.0 - 0.5	Topsoil, silty loam.					
		0.5 - 4.3	Silty, fine grained sand with small rock approximately 25% (2" -).					
		4.3 - 8.0	Fine grained sand, light brown, tan. No samples were collected.					
	BA1-11	0.0 - 1.5	Topsoil, silty loam.	Table A-5	Table A-6		Table A-2	Table A-4
		1.5 - 5.2	Silty with approximately 30% rock (3" -), dark brown.					
		5.2 -7.0	Fine grained sand, very wet but no water running into the test pit. No sample was collected.					
	BA1-12	0.0 - 0.7	Fine sand and gravel.	Table A-5	Table A-6			
		0.7 - 8.0	Medium to fine grained sand. No sample was collected.					
	COMPOSITE	BA1-1	Surface and subsurface composite BA1-1 and BA1-9. This sample was 0 - 3' subsurface composite from approx. same depths, same soil horizon encountered in different locations (silty/fine grain sand).	Table A-5	Table A-6		Table A-2	Table A-4
	SAMPLES	BA1-2	Subsurface composite of BA1-2B and BA1-4B. Same soil horizon encountered 1.17' - 7.0' (silty, sand loam - approx. 20% rock 2"-).	Table A-5	Table A-6		Table A-2	Table A-4
		BA1-3	Surface composite BA1-2A. Topsoil composite.	Table A-5	Table A-6		Table A-2	Table A-4

TAL = Target Analyte List (Total Metals)
ABA = Acid Base Accounting, Sulfur Fractions, and SMP Buffering Capacity
TCLP = Toxicity Characteristic Leaching Procedure - Metals
Agronomic = Agronomic properties of the sample including: Organic Matter Content, Nutrient Content & Fertilizer Recommendation, Cation Exchange Capacity, pH, Electrical Conductivity, Sodium Adsorption Ratio, and Saturation Percentage.
Physical = Physical properties of the sample including: USDA Texture, Rapid Hydrometer, Field Capacity, Wilting Point, and Available Moisture.
A = 0 to 0.5' (Surface) Sample
B = Below Topsoil, Subsurface Sample

TABLE A-2: AGRONOMIC PROPERTIES - McLAREN TAILINGS SITE SAMPLES
September 2001

SAMPLE NO.	SODIUM ADSORPTION RATIO (unitless)	SATURATION PERCENTAGE (%)	ELECTRICAL CONDUCTIVITY (umhos/cm)	pH (SU)	ORGANIC MATTER CONTENT (%)	CATION EXCHANGE CAPACITY (meq/100g)	NITRATE-N (ppm)	PHOSPHORUS (ppm)	BICARBONATE P (ppm)	POTASSIUM (ppm)	FERTILIZER RECOMMENDATION		
											N NITROGEN (lbs/Acre)	P2O5 PHOSPHATE (lbs/Acre)	K2O POTASH (lbs/Acre)
McLaren-WR1-2	0.17	28.0	3230	3.63	1.7	60.8	3	12		67	35	25	30
McLaren-WR1-3	0.04	29.9	19150	2.26	2.2	25.3	2	11		17	35	25	35
McLaren-BA1-1	0.33	20.5	368	7.75	0.6	12.5	4	5		89	40	30	25
McLaren-BA1-2	0.33	23.1	325	7.77	0.9	13.2	3	25	6	83	40	25	30
McLaren-BA1-3	0.70	21.3	101	6.19	1.2	9.8	3	56		94	35	10	25

NOTES: WR - Waste Rock
BA - Borrow Area

TABLE A-3: TCLP METALS RESULTS - McLAREN TAILINGS SITE SAMPLES
September 2001

SAMPLE NO.	As (ug/L)	Ba (ug/L)	Cd (ug/L)	Cr (ug/L)	Pb (ug/L)	Hg (ug/L)	Se (ug/L)	Ag (ug/L)
Tailings	33.4 U	35.4	11	9.4 U	39.8 U	0.07 U	62.3 U	8.1
McLaren-WR1-2	33.4 U	125	4.4 U	9.4 U	39.8 U	0.07 U	62.3 U	6.1
McLaren-WR1-3	33.4 U	31.9	4.4 U	11.1	39.8 U	0.08	62.3 U	17.6
REGULATORY LIMIT	5,000	100,000	1,000	5,000	5,000	200	1,000	5,000

NOTES:

U - Not Detected

WR - Waste Rock

ug/L - micrograms per Liter

TABLE A-4: PHYSICAL PROPERTIES - McLAREN TAILINGS SITE SAMPLES
September 2000 and September 2001

SAMPLE NO.	USDA TEXTURE	RAPID HYDROMETER				FIELD CAPACITY (1/3 Bar %)	WILTING POINT (15 Bar %)	AVAILABLE MOISTURE (%)
		COARSE (%)	SAND (%)	SILT (%)	CLAY (%)			
McLaren-WR1-2	Sandy Clay	28.6	62.0	2.0	36.0	18.32	9.38	8.94
McLaren-WR1-3	Sandy Clay	28.3	60.0	3.0	37.0	27.72	14.97	12.75
McLaren-BA1-1	Sandy Clay Loam	15.8	70.0	7.0	23.0	8.36	3.66	4.70
McLaren-BA1-2	Sandy Clay Loam	45.0	66.0	6.0	28.0	13.05	5.38	7.67
McLaren-BA1-3	Sandy Clay Loam	9.8	62.0	8.0	30.0	10.92	6.58	4.34
SAMPLE NO.	SOIL DESC.					SP. GRAVITY	MAX DRY DENSITY (pcf)	OPT. MOISTURE (%)
^MT-TP-A1	Sandy Silt					3.23	117.50	18.30
^MT-TP-B1	Silty Sand					3.38	135.70	13.20
^MT-TP-C1	Sandy Silt					3.20	120.30	16.70
^MT-TP-D1	Sandy Silt					3.29	122.50	17.00

NOTES:

- ^ = 2000 Data
- WR = Waste Rock
- BA = Borrow Area
- TP = Tailings Pile
- pcf = pounds per cubic foot

TABLE A-5: TOTAL METALS in SOILS AND SEDIMENT SAMPLES RESULTS - McLAREN TAILINGS SITE SAMPLES
August 1993, September 2000, and September 2001

SAMPLE NO.	Sb (mg/kg)	As (mg/kg)	Ba (mg/kg)	Cd (mg/kg)	Co (mg/kg)	Cr (mg/kg)	Cu (mg/kg)	Fe (mg/kg)	Pb (mg/kg)	Mn (mg/kg)	Hg (mg/kg)	Ni (mg/kg)	Ag (mg/kg)	Zn (mg/kg)
* 34-004-WR-1	6.18 UJ	45.3 J	101	1.99	5.13	17.5 J	846	105000	208	191	0.099	8.87	NR	80.1
McLaren-WR1-1	6.00	49.3	136	6.30	NR	19.9	1930	139000	144	199	0.110	5.80	24.2	76.3
McLaren-WR1-2	4.40 U	30.6	154	3.80	NR	33.8	937	104000	166	403	0.050	18.80	12.7	110
McLaren-WR1-3	4.60 U	50.1	51.5	15.80	NR	16.6	7600	267000	130	183	0.100	8.10	30.7	79.5
*34-004-TP-1	7.16 UJ	26.3 J	73.8	2.58	12.8	17.5 J	1700	107000	69	217	0.105	10.40	NR	81.9
*34-004-TP-2	6.71 UJ	41.6 J	69.3	3.00	6.79	21.6 J	3680	163000	104	576	0.179	14.40	NR	162
McLaren-TP1-1	6.40	6.7 U	92.2	0.88 U	NR	16.7	21.4	12500	15.4	293	0.020 U	14.40	0.86	31.7
McLaren-TP1-2	4.50 U	38.9	122.0	10.50	NR	16.2	1240	182000	97.6	102	0.190	4.20	18.0	48.7
McLaren-BA1-1	4.20 U	7.0	89.3	0.90 U	NR	15.8	24.9	13500	20.5	314	0.020 U	16.30	0.84 U	37.2
McLaren-BA1-2	4.40 U	10.3	147.0	1.00 U	NR	36.3	31.1	23600	53.9	696	0.030	30.50	0.89 U	81.5
McLaren-BA1-3	4.60	6.9 U	156.0	0.91 U	NR	28.0	20.6	20900	19.4	449	0.020 U	25.60	0.85 U	54.0
McLaren-BG1-1	4.60 U	19.6	253.0	1.50	NR	34.7	63.5	24500	75.2	710	0.030	26.10	0.93 U	93.1
McLaren-BG1-2	4.30 U	18.4	176.0	1.00	NR	33.3	40.5	22700	73.6	695	0.020	22.20	0.88 U	116
McLaren-BG1-3	6.40	19.8	604.0	2.60	NR	54.5	68	33900	61.8	1640	0.080	46.20	1.15 U	206
*34-009-SS-1	5.17 U	14.6 J	89.0	0.40 U	10.5 J	30.7	40	23300	158 J	1450 J	0.058 J	20.70	NR	181
McLaren-OSC-1	4.60 U	23.3	108.0	16.40	NR	32.9	832	238000	31	199	0.040	14.10	0.94 U	40.3
McLaren-OSC-2	4.50 U	25.9	103.0	4.20	NR	7.8	398	90000	58.4	68.6	0.120	3.40	6.45	38.2
*34-004-SE-1	7.24 UJ	10.6 J	86.2	0.61 U	11.9	14.4 J	214	20400	59.1	557	0.047	19.70	NR	98.2
*34-004-SE-2	7.11 UJ	7.37 J	93.5	0.60 U	12.9	17.0 J	243	15400	55.1	504	0.035 U	23.10	NR	98.7
*34-004-SE-3	5.36 UJ	4.12 U	88.0	0.45 U	7.91	13.0 J	103	20500	116	658	0.040 U	14.30	NR	102
^MT-SE-1	3.60 U	8	89.0	2.00	11.9	12.6	187	20400	44	778	0.011 U	19.90	1.00	98.2
^MT-SE-2	3.60 U	15.1	89.1	2.90	11.8	16.6	207	27500	57.2	699	0.015	23.50	1.10	102
^MT-SE-3	3.70	6.6	72.3	1.90	8.8	16.4	110	17500	44.5	442	0.013 U	20.20	0.86 U	84.9
^MT-SE-4	3.50 U	6.8	85.5	2.10	12.7	20.3	309	18900	85.3	471	0.018	25.20	0.87 U	139
^MT-SE-5	3.60 U	6.7 U	62.1	1.00	6.6	15.3	21.9	12500	40.4	390	0.011 U	16.80	0.89 U	65.8

NOTES:

U - Not Detected
J - Estimated Quantity
NR - Not Requested
WR - Waste Rock
TP - Tailings Pile
BA - Borrow Area
BG - Background Sample
*34-009-SS-1 - Background Sample from the Little Daisy Mine (34-009-SS-1)
OSC - Old Stream Channel
* - 1993 AMRB Hazardous Materials Inventory Analytical Results
*34-004-SE-1: Downgradient on Soda Butte Creek.
*34-004-SE-2: Miller Creek just above confluence with Soda Butte Creek.
*34-004-SE-3: Upgradient on Soda Butte Creek.

^ - 2000 Site Investigation Data
^MT-SE-1: Downgradient of McLaren Tailings impoundment & confluence with Miller Creek on Soda Butte Creek.
^MT-SE-2: Downgradient of McLaren Tailings seeps and Soda Butte Creek confluence.
^MT-SE-3: Upgradient of seep impacts in Soda Butte Creek.
^MT-SE-4: Miller Creek prior to confluence with Soda Butte Creek.
^MT-SE-5: Upgradient of McLaren Tailings and mine site impacts.
mg/kg: milligram per kilogram

TABLE A-6: ACID BASE ACCOUNTING RESULTS - McLAREN TAILINGS SITE SAMPLES
August 1993 and September 2001

SAMPLE NO.	TOTAL SULFUR %	Sulfate Sulfur %	Insoluble Sulfide S %	Sulfide Sulfur %	Organic Sulfur %	Neut. Pot. t/1000t	T. S. AB t/1000t	T. S. ABP t/1000t	PyrS AB t/1000t	PyrS ABP t/1000t	SMP Buffer (t/1000t)	SMP Lime Requirements (t/1000t)	ABA Lime Requirements (t/1000t)	Total Lime Requirement (t/1000t)	Lime Req. Dollhopf (t/ac.) 1ft.
*34-004-TP-1	6.10	0.00	0.00	7.05	0.82	116.00	191.00	-74.90	220.00	-105.00	10.00	10.00	245.94	174.9	367.3
*34-004-TP-2	14.10	2.89	0.00	4.21	7.00	9.83	440.00	-431.00	132.00	-122.00	10.00	10.00	418.05	522.8	1097.8
*34-004-WR-1	1.14	0.76	0.00	0.01	0.37	-3.22	35.60	-38.80	0.31	-3.53	10.00	10.00	29.69	53.6	112.6
McLaren-WR1-2	1.14	0.43	0.09	0.58	0.05	75.6	35.73	39.90	20.03	55.60	16.80	16.80	32.58	0.0	0.0
McLaren-WR1-3	10.76	1.53	0.42	8.04	0.76	155.6	336.13	-180.50	261.07	-105.40	29.80	29.80	323.99	247.7	520.2
McLaren-BA1-1	<0.01	0.00	0.00	0.00	0.00	253.9	0.00	253.90	<0.55	253.90	0.00	0.00	0.00	0.0	0.0
McLaren-BA1-2	<0.01	0.00	0.00	0.00	0.00	141.7	0.00	141.70	<0.55	141.70	0.00	0.00	0.00	0.0	0.0
McLaren-BA1-3	<0.01	0.00	0.00	0.00	0.00	0.0	0.00	<0.01	<0.55	<0.06	3.90	3.90	0.00	4.9	10.2
McLaren-OSC-1	1.53	0.75	0.52	0.26	0.00	105.5	47.91	57.60	20.28	85.20	16.80	16.80	41.96	0.0	0.0
McLaren-OSC-2	2.16	1.35	0.13	0.66	0.02	12.5	67.57	-55.10	23.73	-11.20	11.80	11.80	56.96	70.3	147.7

NOTES: *34-004-TP-1, TP-2, and WR-1 were collected in August, 1993.

TP - Tailings Pile

WR - Waste Rock

BA - Borrow Area

OSC - Old Stream Channel

t/1000t - tons per 1,000 tons

(t/ac.) 1 ft - tons per acre at a depth of 1 foot

TABLE A-7: METALS IN WATER RESULTS - McLAREN TAILINGS SITE SAMPLES
August 1993 and September 2000

SAMPLE NO.	Sb (ug/L)	As (ug/L)	Ba (ug/L)	Cd (ug/L)	Co (ug/L)	Cr (ug/L)	Cu (ug/L)	Fe (ug/L)	Pb (ug/L)	Mn (ug/L)	Hg (ug/L)	Ni (ug/L)	Ag (ug/L)	Zn (ug/L)	Hardness Calc. (mg CaCO3/L)
*34-004-GW-1	30.70 U	1.57 JX	58.7	2.57 U	32	6.83 U	4.37 JX	117000	2.28 J	4240	0.29	26.5 J	NR	79	731
*34-004-GW-2	30.70 U	1.43 JX	25.0	2.57 U	9.7 U	17.10	3.1 JX	96200	2.95 J	2010	0.22	12.7 U	NR	7.57 U	2850
*34-004-SW-1	30.70 U	1.12 UJX	45.7	2.57 U	9.7 U	6.83 U	8.87 JX	827	3.2 J	82.8	0.22	12.7 U	NR	9.1	119
*34-004-SW-2	30.70 U	1.14 JX	29.3	2.57 U	9.7 U	6.83 U	8.5 JX	75.6	3.05 J	5.03	0.22	12.7 U	NR	13.8	78.7
*34-004-SW-3	30.70 U	1.84 JX	54.8	2.57 U	9.7 U	6.83 U	4.1 JX	32.8	2.3 J	5.77	0.40	15.7 J	NR	11.3	125
^MT-SW-1	2.80 U	2.1	54.6	0.13	7.6 U	9.20 U	2 U	2260.0	1.2 U	105	0.08 U	10.5 U	0.63 U	14.7	156
^MT-SW-2	2.80 U	2.2	54.9	0.15	7.6 U	9.20 U	2 U	2820.0	1.2 U	121	0.08 U	10.5 U	0.63 U	14.7	157
^MT-SW-3	2.80 U	1.6 U	55.8	0.10	7.6 U	9.20 U	2 U	15.5 U	1.2 U	2.9 U	0.08 U	10.5 U	0.63 U	15.7	124
^MT-SW-4	2.80 U	1.6 U	38.3	0.096	7.6 U	9.20 U	2.5	15.5 U	1.2 U	2.9 U	0.08 U	10.5 U	0.63 U	11.1 U	116
^MT-SW-5	2.80 U	1.6 U	55.5	0.07 U	7.6 U	9.40	2 U	15.5 U	1.2 U	2.9 U	0.08 U	10.5 U	0.63 U	12.3	137
^MT-SW-6	2.80 U	5.8	57.1	0.07 U	11.6	9.20 U	2 U	85100.0	1.2 U	2470	0.08 U	12.1	0.97	20.5	490
^MT-SW-7	2.80 U	2.1	78.4	0.07 U	7.6 U	9.20 U	2 U	38.6	1.2 U	12.2	0.08 U	10.50 U	0.63 U	11.1 U	167

NOTES:

U - Not Detected

J - Estimated Quantity

X - Outlier for Accuracy or Precision

NR - Not Requested

* - 1993 AMRB Hazardous Materials Inventory Analytical Results

*34-004-GW-1: Seepage at toe of tailings.

*34-004-GW-2: Monitoring well at West end of tailings.

*34-004-SW-1: Downgradient on Soda Butte Creek.

*34-004-SW-2: Miller Creek just above confluence with Soda Butte Creek.

*34-004-SW-3: Upgradient on Soda Butte Creek.

^ - 2000 Site Investigation Data

^ MT-SW-1: Downgradient of McLaren Tailings impoundment & confluence with Miller Creek on Soda Butte Creek.

^ MT-SW-2: Downgradient of McLaren Tailings seeps and Soda Butte Creek confluence.

^ MT-SW-3: Upgradient of seep impacts in Soda Butte Creek.

^ MT-SW-4: Miller Creek prior to confluence with Soda Butte Creek.

^ MT-SW-5: Upgradient of McLaren Tailings and mine site impacts.

^ MT-SW-6: Seep on south side of tailings dam toe.

^ MT-SW-7: Seep on north side of tialings dam toe.

ug/L: micrograms per Liter

mg CaCO3/L: milligrams calcium carbonate per Liter

TABLE A-8: WET CHEMISTRY RESULTS - McLAREN TAILINGS SITE SAMPLES
August 1993 and September 2000

SAMPLE NO.	Total Dissolved Solids (mg/L)	Chloride (mg/L)	Sulfate (mg/L)	NO3/NO2-N (mg/L)	Cyanide (mg/L)
*34-004-GW-1	1180	5	692	<0.05	NR
*34-004-GW-2	4360	5	2660	<0.05	NR
*34-004-SW-1	165	< 5	25	<0.05	NR
*34-004-SW-2	115	7	21	<0.05	NR
*34-004-SW-3	155	<5	7	<0.05	NR
^MT-SW-1	165		46		
^MT-SW-2	171		40		
^MT-SW-3	147		10		
^MT-SW-4	136		39		
^MT-SW-5	142.00		9.9		
^MT-SW-6	857.00		435.0		
^MT-SW-7	347.00		74.9		

NOTES:

* - 1993 AMRB Hazardous Materials Inventory Analytical Results

*34-004-GW-1: Seepage at toe of tailings.

*34-004-GW-2: Monitoring well at West end of tailings.

*34-004-SW-1: Downgradient on Soda Butte Creek.

*34-004-SW-2: Miller Creek just above confluence with Soda Butte Creek.

*34-004-SW-3: Upgradient on Soda Butte Creek.

^ - 2000 Site Investigation Data

^ MT-SW-1: Downgradient of McLaren Tailings impoundment & confluence with Miller Creek on Soda Butte Creek.

^ MT-SW-2: Downgradient of McLaren Tailings seeps and Soda Butte Creek confluence.

^ MT-SW-3: Upgradient of seep impacts in Soda Butte Creek.

^ MT-SW-4: Miller Creek prior to confluence with Soda Butte Creek.

^ MT-SW-5: Upgradient of McLaren Tailings and mine site impacts.

^ MT-SW-6: Seep on south side of tailings dam toe.

^ MT-SW-7: Seep on north side of tailings dam toe.

mg/L: milligrams per Liter